46097

CORRES CONTROL
OUTGOING LTR NO

DOE ORDER# 5400.1

94 RF 11490

EG&G ROCKY FLATS

EG&G ROCKY FLATS, INC
ROCKY FLATS PLANT P O BOX 464 GOLDEN COLORADO 80402 0464 • (303) 966 7000

DIST	TP	ENC
AMARAL M E		
BURLINGAME A H		
BUSBY W S		
BRANCH D B		
CARNIVAL G J		
DAVIS J G		
FERRERA D W		
FRAY R E		
GEIS J A		
GLOVER W S		
GOLAN P M		
HANNI B J		
HARMAN L K		
HEALY T J		
HEDAHL T		
HILBIG J G		
HUTCHINS N M		
JACKSON D T		
KELL R E		
KUESTER A W		
MARX G E		
McDONALD M M		
McKENNA F G		
MONTROSE J K		
MORGAN R V		
POTTER G L		
PIZZUTO V M		
RISING, T L		
SANDLIN, N B		
SCHWARTZ J K		
SETLOCK, G H		
STEWART, D L		
STIGER, S G	X	X
Brooks LM	X	X
Hopkins JK	X	X
Levin ME	X	X
Eichwald B	X	X
Ward D	X	X
Hollowell (Trading)		
CORRES CONTROL	X	X
ADMN RECORD/080	X	X
TRAFFIC		
PATS/T130G		

CLASSIFICATION

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE
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IN REPLY TO RFP CC NO
4040 RF 94
ER BT 10997

ACTION ITEM STATUS
☒ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS
LMB: LMB

ORIG & TYPIST INITIALS
LMB: klq

November 15, 1994 94-RF-11490

Jessie M Roberson
Assistant Manager for
Environmental Restoration
DOE, RFFO

STATE OF COLORADO WATER QUALITY STANDARDS - SGS-598-94

Action None at this time

This letter responds to the U S Department of Energy/Rocky Flats Field Office (DOE/RFFO) October 25 1994 correspondence (ER BT 10997) regarding Colorado Water Quality Standards EG&G Rocky Flats, Inc (EG&G) has evaluated the issues identified in the letter and understands the context of DOE/RFFO's questions with regard to upcoming Applicable or Relevant and Appropriate Requirements (ARARs) negotiations with the U S Environmental Protection Agency and the Colorado Department of Public Health and Environment

This response lists questions identified in the letter in italicized form Each question is followed by EG&G's responses

(1) *Can the Rocky Flats Environmental Technology Site (Site) meet Colorado statewide water quality standards for both groundwater and surface water? If yes, at which point of compliance (e g operable unit (OU) versus site boundary)?*

Based on a cursory review of existing data, the site currently does not comply with Colorado statewide groundwater standards Comparison of water-quality data for monitoring wells at the eastern site boundary with statewide groundwater standards and background studies indicates exceedances at the site boundary for selected trace metals, major cations/anions, and gross alpha The OU-specific comparison of groundwater with statewide groundwater standards indicates current exceedances for organic compounds, selected trace metals, major cations/anions, and radionuclides

Based on EG&G's professional judgement, it may eventually be possible to meet statewide groundwater quality standards at the site boundary, however, it is highly unlikely that the statewide groundwater standards can be met on an OU-specific basis The degree to which the statewide groundwater standards can be met will be dependant upon the ability to attenuate existing constituent levels at downgradient points of compliance This will be more problematic on an OU-specific basis in cases where non-aqueous phase liquids (NAPLs) may be present There is no indication of NAPLs at the site boundary The inability of pump and treat technologies to permanently reduce the volume, toxicity, and mobility of NAPLs in groundwater is well documented in the literature

With regard to surface water, all discharges from the Site currently meet existing statewide stream standards before surface water is released from the site Under the Agreement in Principle between DOE and the State, the State will not allow a release if there is an exceedance of any stream standard, in the past five years, there have been no exceedances which prevented a discharge However in the past several years, the State has established stream standards for an increasing number of constituents, as well as reducing existing standards In some cases, the effective stream standard is the ability of analytical technology to detect the constituent (the practical quantification limit) where the

ADMIN RECORD

A-OU06-000037

adopted standard is below detection As analytical methods improve, the effective standards are reduced, potentially requiring new treatment technologies to meet more restrictive standards

(2) Can the Site meet the Colorado site-specific water quality standards for both groundwater and surface water? If yes, at which point of compliance (e g OU versus site boundary)?

Based on a cursory review of existing data, the site currently does not comply with Colorado site-specific groundwater quality standards Comparison of water-quality data for monitoring wells at the eastern site boundary with site-specific groundwater standards and background studies indicates exceedances at the site boundary for selected trace metals, major cations/anions, and gross alpha The OU-specific comparison of groundwater with site-specific groundwater standards indicates current exceedances for organic compounds, selected trace metals, major cations/anions, and radionuclides When compared with the statewide standards, the radionuclide site-specific standards are incrementally most problematic

Based on EG&G's professional judgement, it may eventually be possible to meet site-specific groundwater quality standards at the site boundary, however, it is highly unlikely that the site-specific groundwater standards can be met on an OU-specific basis

A significant issue is that the site-specific standards were set using very limited data in a climate of adverse community relations following the Federal Bureau of Investigation's investigation of the Site As a result, some standards are more stringent than the background levels determined in the 1993 Background Geochemical Characterization Report for a number of parameters Generally, Colorado allows ambient-based standards to be set at the 85th percentile of available water quality data EG&G believes that an appropriate approach would be to request a modification of those standards in consideration of background groundwater quality rather than treating unimpacted groundwater to better than background at a significant cost Additionally, it may be possible to present evidence of natural elevation of concentrations of metals and water quality parameters above upgradient background To support this position, geochemical reaction path modelling and probably installation and sampling of offsite wells analogous to downgradient conditions at the Site would be required Depending on the results, this may provide a technically and legally defensible rationale for even less stringent standards than would be the case with considerations of background alone EG&G believes the potential cost savings of this approach would more than justify the necessary investment of resources, however, resources would have to be identified

With regard to surface water, the Site currently meets site-specific stream standards for surface waters at the site boundary There is no mechanism currently in place to restrict surface water flows within specific OUs and to evaluate water quality at the OU boundary, except for OU5 discharges from Pond C-2, and OU6 which comprises the surface water management ponds As part of the National Pollutant Discharge Elimination System Storm Water Permit Application, EG&G evaluated storm water quality within the industrial area of the Site For certain periods of storm events, stream standards are exceeded by the runoff If CERCLA is interpreted to apply to storm waters leaving an OU, then the stream standards can not be met

(3) How cost prohibitive is it to meet either standard described in the previous two questions?

EG&G anticipates that the present-worth cost for compliance with the statewide groundwater standards at the site boundary will be in the $50 million range (30-year project life) Groundwater

(3) How cost prohibitive is it to meet either standard described in the previous two questions? (continued)

remediation would require construction of french drains across groundwater flow paths at the site boundary, which are assumed to generally follow the topography of the site Approximately twenty gallons per minute (gpm) would be collected and treated for metals and radionuclides at a new treatment plant located near the eastern site boundary Treated groundwater would be discharged to surface water at the site boundary For the site-specific groundwater standards, an extended duration of treatment will likely be required to reduce levels of constituents at the site boundary The present-worth cost to achieve compliance with site-specific groundwater standards at the site boundary could therefore escalate significantly from the above estimate EG&G believes that achievement of either a site-specific or statewide standard on an OU-specific basis will be technically impracticable and would be cost-prohibitive, resulting in costs well in excess of $100 million present worth This cost includes construction of french drains along the down-gradient sides of each OU, or in certain cases groups of OUs, to contain contaminated groundwater It was assumed that groundwater would be collected from all OUs and treated for organics, metals, and radionuclides at the existing interim measure/interim remedial action (IM/IRA) treatment facility (Building 881) and that modifications to the IM/IRA treatment facility would be required, along with construction of a new parallel treatment facility

The responses provided here are preliminary and are currently not supported by a legally defensible analysis or detailed engineering estimates However, EG&G believes that the information is sufficient for DOE/RFFO to develop an initial position for the forthcoming ARARs negotiations

Attached is a recently completed analysis of data for site boundary wells Please contact Laura Brooks on extension 6973 if you have any questions regarding these responses or should you require additional information

S G Stiger, Director
Environmental Restoration Program Division
EG&G Rocky Flats Inc

LMB kld

Orig and 1 cc - J M Roberson

Attachment
As Stated

cc
D A Brockman - AMESH, RFFO
M N Silverman - DOE/RFFO
G S Hill - ESH, RFFO
F R Lockhart - ER RFFO
T S Howell - OCC RFFO
M J Roy - OCC, RFFO

ANALYSIS OF DATA FOR RFETS BOUNDARY WELLS

ORGANIC COMPOUNDS

Location	Analyte	No above any std	MCLG	MCL	SMCL	Site	State	No background for organics
41591	Carbon tetrachloride	1	0	5			0 3	

WATER-QUALITY PARAMETERS

Location	Analyte	No above any std	MCLG	MCL	SMCL	Site	State	Back_mean	Back_UTL	Mean+2SD
0186	Sulfate	1		250000	250000	250000	250000	86230	543870	435500
	TDS	1		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
0286	Chloride	2		250000	250000	250000	250000	12830	57200	46530
	Fluoride	3	4000	4000	2000	4000	4000	690	4560	3656
	Sulfate	1		250000	250000	250000	250000	86230	543870	435500
	TDS	5		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
0386	TDS	14		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
0486	TDS	2		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
06491	Sulfate	8		250000	250000	250000	250000	86230	543870	435500
	TDS	8		500000	500000	Bkdg*1 25	Bkdg*1.25	354150	11671000	978780
41591	Fluoride	2		4000	2000	4000	4000	690	4560	3656
	TDS	9		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
41691	TDS	7		500000	500000	Bkdg*1 25	Bkdg*1.25	354150	11671000	978780
B217289	Chloride	3		250000	250000	250000	250000	12830	57200	46530
	TDS	3			500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780
B303089	Chloride	9		250000	250000	250000	250000	12830	57200	46530
	Fluoride	10		4000	2000	4000	4000	690	4560	3656
	Sulfate	10		250000	250000	250000	250000	86230	543870	435500
	TDS	10		500000	500000	Bkdg*1 25	Bkdg*1 25	354150	11671000	978780

Units in micrograms per liter (ug/L)
Data for samples collected 1990 to first quarter of 1994
This evaluation performed November 1 1994 updated November 9 1994
Where "Back_mean" is the mean value for all background wells (See 1993 Background Geochemical Characterization Report) "Back_UTL" is the 99/99 upper tolerance limit calculated for all background wells and "Mean+2SD" is the background mean plus two standard deviations.

ANALYSIS OF DATA FOR RFETS BOUNDARY WELLS

DISSOLVED RADIONUCLIDES

Location	Analyte	No above any std.	MCLG	MCL	SMCL	Site	State	Back_mean	Back_UTL	Mean+2SD
0186	Gross alpha	3		15		7	15	8 35	94 55	72 98
WOMAN	Gross beta	4				5	4 mrem/yr	4 89	37 71	29 35
0286	Gross alpha	5		15		7	15	8 35	94 55	72 98
WOMAN	Gross beta	4				5	4 mrem/yr	4 89	37 71	29 35
0386	Gross alpha	8		15		11	15	8.35	94 55	72 98
WALNUT	Gross beta	0				19	4 mrem/yr	4 89	37 71	29 35
06491	Gross alpha	6		15		11	15	8 35	94 55	72 98
WALNUT	Gross beta	4				19	4 mrem/yr	4 89	37 71	29 35
41491	Gross alpha	2		15		7	15	8 35	94 55	72 98
WOMAN	Gross beta	2				5	4 mrem/yr	4 89	37 71	29 35
41591	Gross alpha	7		15		7	15	8 35	94 55	72 98
WOMAN	Gross beta	7				5	4 mrem/yr	4 89	37 71	29 35
41691	Gross alpha	1		15		11	15	8 35	94 55	72 98
WALNUT	Gross beta	1				19	4 mrem/yr	4 89	37 71	29 35
B303089	Gross alpha	3		15		7	15	8 35	94 55	72 98
WOMAN	Gross beta	3				5	4 mrem/yr	4 89	37 71	29 35

Units in picocuries per liter (pCi/L) except where noted
Data for samples collected 1990 to first quarter of 1994
This evaluation performed November 1, 1994, updated November 9 1994
Where n is the number of records for the well.

Well 0486 has mean URANIUM = 4 7 ug/L, Well 41691 has mean URANIUM = 5 9 ug/L Well 06491 has mean URANIUM = 4 7 ug/L
Well B217289 has mean URANIUM = 0 5 ug/L, Well 0386 has mean URANIUM = 29 3 ug/L Well 40491 has no data for URANIUM
Well B317189 has no data for URANIUM, Well 0286 has mean URANIUM = 36 2 ug/L, Well 41591 has mean URANIUM = 26 4 ug/L
Well 0186 has mean URANIUM = 14 8 ug/L, Well 41491 has mean URANIUM = 23 7 ug/L, Well B303089 has mean URANIUM = 403 5 ug/L
Mean URANIUM for RFETS Background = 20 6 ug/L. MCL for URANIUM = 20 ug/L

Where "Back_mean" is the mean value for all background wells (See 1993 Background Geochemical Characterization Report) "Back_UTL" is the 99/99 upper tolerance limit calculated for all background wells and "Mean+2SD" is the background mean plus two standard deviations.

ANALYSIS OF DATA FOR RFETS BOUNDARY WELLS

DISSOLVED METALS

Location	Analyte	No above any std.	MCLG	MCL	SMCL	Site	State	Back_mean	Back_UTL	Mean+2SD
0186	Antimony	1	6	6		6	6	24 6	47 8	42 2
	Manganese	1			50	50	50	32.7	263	208
	Nickel	1	100	100		100	100	15 5	34	29 5
0286	Antimony	1	6	6		6	6	24 6	47 8	42 2
0386	Aluminum	1			50 to 200	5000	5000	113 7	1684	1303
	Antimony	3	6	6		6	6	24 6	47 8	42 2
	Barium	16	2000	2000	200	1000	1000	84	171.2	150.2
	Cadmium	1	5	5		5	5	2.45	4 26	3 83
	Iron	1			300	300	300	93 6	1553	1202
	Nickel	1	100	100		100	100	15 5	34	29 5
	Selenium	16	50	50		10	10	20 5	483	368
0486	Antimony	4	6	6		6	6	24 6	47 8	42 2
	Manganese	14			50	50	50	32.7	263	208
41591	Antimony	1	6	6		6	6	24 6	47 8	42 2
	Manganese	3			50	50	50	32.7	263	208
41691	Antimony	1	6	6		6	6	24 6	47 8	42 2
	Manganese	10			50	50	50	32.7	263	208
B217289	Barium	3	2000	2000	200	1000	1000	84	171 2	150 2
	Manganese	2			50	50	50	32.7	263	208

Units in micrograms per liter (ug/L)
Data for samples collected 1990 to first quarter of 1994
This evaluation performed November 1 1994 updated November 9 1994
Where "Back_mean" is the mean value for all background wells (See 1993 Background Geochemical Characterization Report) "Back_UTL" is the 99/99 upper tolerance limit calculated for all background wells and "Mean+2SD" is the background mean plus two standard deviations.

LIST OF EXCEEDANCES FOR RFETS BOUNDARY WELLS

ORGANIC COMPOUNDS

Location	Analyte	No. above any std.	MCLG	MCL	SMCL	Site	State	Measured value and qualifier
41591	Carbon tetrachloride	1		5		0 3	0 3	0 93 B

WATER-QUALITY PARAMETERS

Location	Analyte	No. above any std.	MCLG	MCL	SMCL	Site	State	Measured values of exceedances
0186	Sulfate, n = 8	1			250000	250000	250000	300000 on 6/10/92
	TDS, n = 8	1			500000	Bkdg*1 25	Bkdg*1 25	570000 pm 6/23/93
0286	Chloride n = 5	2			250000	250000	250000	290000 on 6/10/92, 350000 on 3/19/90
	Fluoride n = 5	3	4000	4000	2000	4000	4000	4200, 5000 5500
	Sulfate n = 5	1			250000	250000	250000	290000 on 3/19/90
	TDS n = 5	5			500000	Bkdg*1.25	Bkdg*1 25	730000 840000, 1080000 1100000 and 1300000
0386	TDS n = 16	14			500000	Bkdg*1 25	Bkdg*1 25	540000 to 600000
0486	TDS, n = 13	2			500000	Bkdg*1 25	Bkdg*1.25	510000 on 6/11/92, 550000 on 3/19/90
06491	Sulfate, n = 8	8			250000	250000	250000	590000 to 1200000
	TDS n = 8	8			500000	Bkdg*1 25	Bkdg*1 25	1410000 to 30000000
41591	Fluoride n = 9	2	4000	4000	2000	4000	4000	4050 on 12/8/93, 4580 on 9/20/93
	TDS, n = 9	9			500000	Bkdg*1 25	Bkdg*1 25	650000 to 950000
41691	TDS, n = 16	7			500000	Bkdg*1 25	Bkdg*1 25	528000 to 830000
B217289	Chloride, n = 3	3			250000	250000	250000	631000 650000 820000
	TDS, n = 3	3			500000	Bkdg*1.25	Bkdg*1 25	1100000 to 1200000
B303089	Chloride, n = 10	9			250000	250000	250000	256000 to 600000
	Fluoride, n = 10	10	4000	4000	2000	4000	4000	6500 to 8200
	Sulfate n = 10	10			250000	250000	250000	2200000 to 6500000
	TDS, n = 10	10			500000	Bkdg*1 25	Bkdg*1 25	4000000 to 5600000

Units in micrograms per liter (ug/L)
Data for samples collected 1990 to first quarter of 1994
This evaluation performed November 1 1994 updated November 9 1994
Where n is the number of records for the well.

LIST OF EXCEEDANCES FOR RFETS BOUNDARY WELLS

DISSOLVED RADIONUCLIDES

Location	Analyte	No above any std.		MCL	SMCL	Site	State	Measured values of exceedances
0186 WOMAN	Gross alpha, n = 8	3		15		7	15	7.215, 11 0, 11 0
	Gross beta, n = 7	4		4 mrem/yr		5	4 mrem/yr	5 353, 7 5 8 1, 15 0
0286 WOMAN	Gross alpha, n = 5	5		15		7	15	11 57 14 0, 16 8 20 7 33 64
	Gross beta, n = 5	4		4 mrem/yr		5	4 mrem/yr	6 85, 9 4 10 01, 23 56
0386 WALNUT	Gross alpha, n = 14	8		15		11	15	13 87 14 0, 14 0, 15 35 16 15 17 0 23 29 and 26 2
	Gross beta, n = 13	0		4 mrem/yr		19	4 mrem/yr	
06491 WALNUT	Gross alpha, n = 6	6		15		11	15	38 0 40 35 45 0, 45 0 57 73 60 0
	Gross beta, n = 6	4		4 mrem/yr		19	4 mrem/yr	24 0 24 59, 25 0, 28 29
41491 WOMAN	Gross alpha, n = 2	2		15		7	15	8 0, 14 0
	Gross beta, n = 2	2		4 mrem/yr		5	4 mrem/yr	8 8 11 0
41591 WOMAN	Gross alpha, n = 8	7		15		7	15	9 8 10 18 13, 13 03 14 0 15 0 19 0
	Gross beta, n = 9	7		4 mrem/yr		5	4 mrem/yr	6 08 6 3 7 44 7 8 9 1 9 59, 11 0
41691 WALNUT	Gross alpha, n = 8	1		15		11	15	67 0 on 11/18/92
	Gross beta, n = 9	1		4 mrem/yr		19	4 mrem/yr	90 0 on 11/18/92 (The above values are one order of magnitude greater than all other values for well 41691)
B303089 WOMAN	Gross alpha, n = 3	3		15		7	15	152 5 160 270
	Gross beta, n = 3	3		4 mrem/yr		5	4 mrem/yr	53 05 63 0 120

Units in picocuries per liter (pCi/L) except where noted.
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Where n is the number of records for the well

Well 0486 has mean URANIUM = 4 7 ug/L, Well 41691 has mean URANIUM = 5 9 ug/L, Well 06491 has mean URANIUM = 4 7 ug/L,
Well B217289 has mean URANIUM = 0 5 ug/L, Well 0386 has mean URANIUM = 29 3 ug/L, Well 40491 has no data for URANIUM
Well B317189 has no data for URANIUM, Well 0286 has mean URANIUM = 36 2 ug/L, Well 41591 has mean URANIUM = 26 4 ug/L
Well 0186 has mean URANIUM = 14 8 ug/L, Well 41491 has mean URANIUM = 23 7 ug/L, Well B303089 has mean URANIUM = 403 5 ug/L,
Mean URANIUM for RFETS Background = 20 6 ug/L MCL for URANIUM = 20 ug/L

LIST OF EXCEEDANCES FOR RFETS BOUNDARY WELLS

DISSOLVED METALS

Location	Analyte	No above any std	MCLG	MCL	SMCL	Site	State	Measured values of exceedances
0186	Antimony n = 7	1	6	6		6	6	41 1 on 6-19-91
	Manganese, n = 7	1			50	50	50	115 on 3-13-91
	Nickel n = 7	1	100	100		100	100	179 on 3-13-91
0286	Antimony n = 5	1	6	6		6	6	87 5 on 6-19-91
0386	Aluminum, n = 16	1			50 to 200	5000	5000	426 on 6-8-90
	Antimony n = 16	3	6	6		6	6	14 6, 22.1, 50.8
	Barium n = 16	16	2000	2000	200	1000	1000	201 to 260
	Cadmium, n = 16	1	5	5		5	5	6.3 on 9-11-91
	Iron n = 16	1			300	300	300	312 on 9-11-91 (all other results < 50)
	Nickel n = 16	1	100	100		100	100	108 on 4-1-92
	Selenium, n = 16	16	50	50		10	10	30 9 to 69 6
0486	Antimony, n = 14	4	6	6		6	6	10 7, 16 9 21 2, 31 0
	Manganese, n = 14	14			50	50	50	447 2 to 1010
41591	Antimony n = 9	1	6	6		6	6	33 0 on 12-6-91
	Manganese n = 9	3			50	50	50	63 6, 294, 1200 on 12-6-91
41691	Antimony n = 10	1	6	6		6	6	10 5
	Manganese n = 10	10			50	50	50	363 to 969
B217289	Barium n = 3	3	2000	2000	200	1000	1000	384, 398 405
	Manganese n = 3	2			50	50	50	54 6 56 9

Units in micrograms per liter (ug/L)
Data for samples collected 1990 to first quarter of 1994
This evaluation performed November 1 1994 updated November 9 1994
Where n is the number of records for the well.
NOTE The EPA s contract-required detection limit (CRDL) for Antimony is 60 UG/L